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EXAMINER	
YUAN, KATHLEEN S	
ART UNIT	**PAPER NUMBER**
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/620,192	EVANS ET AL.	
	Examiner	Art Unit	
	Kathleen S. Yuan	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-7, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5861910 (McGarry) in view of U.S. Patent No. 7031791 (Chang).

Regarding claim 1, McGarry et al discloses a non-oriented optical character recognition apparatus for use in locating and reading markings on a silicon wafer (fig. 1A), the apparatus comprising: a camera (col. 5, line 43) for taking a plurality of sequential line images of the silicon wafer to produce a first wafer image, a image in the first darkfield mode (col. 12, lines 39-40); an illumination device for projecting at least two different types of illumination along the path of travel intersected by the wafer in the area that the line images are taken (col. 12, lines 39-43), the illumination device is adapted to change the type of illumination in a synchronous manner with the taking of the plurality of line images (col. 12, lines 39-43); and a processor in electronic communication with the camera for separating the line images from the first wafer image into at least two separate wafer images of different illumination, the processor

being what controls the illumination, since this results in separating the first wafer image as the image of the particular type of illumination (col. 12, lines 39-43), identifying the wafer marking on at least one of the at least two wafer images of different illumination by seeing the indicia present, and reading the wafer mark (col. 1, lines 34-36).

McGarry et al does not disclose expressly that the wafers are traveling with respect to the camera.

Chang discloses that wafers are traveling with respect to the whole system since they are traversing (fig. 5 and col. 14, lines 29-31).

McGarry et al and Chang are combinable because they are from the same field of endeavor, i.e. product inspection.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the product traveling with respect to the camera.

The suggestion/motivation for doing so would have been provide an efficient, automated system by allowing the system to inspect many wafers automatically. Without the wafers moving with respect to the camera, each system would only be able to inspect one wafer, thus providing a very expensive system. By allowing the system to inspect more than one wafer, this is being more cost efficient.

Therefore, it would have been obvious to combine McGarry et al with Chang to obtain the invention as specified in claim 1.

3. Regarding claim 2, Chang discloses that the camera is positioned above (fig. 5, item 302) and at a first angle from the vertical, an angle of 0 degrees, with respect to the first path of travel, since the products are traversing (col. 14, lines 29-31).

4. Regarding claim 3, McGarry et al discloses using a CCD array (col. 3, lines 3-4).

5. Regarding claim 4, Chang discloses that the camera further comprises at least two individual cameras positioned adjacent one another and transverse to the path of travel (fig. 5, items 302).

6. Regarding claim 5, McGarry et al discloses that the at least two different types of illumination include a dark field illumination (col. 12, lines 40-49).

7. Regarding claim 6, McGarry et al discloses that the illumination device is positioned above and at a second angle from the vertical (fig. 1a, items 24), and angle of 0 degrees. Chang discloses that the system is placed with respect to the first path of travel (col. 14, lines 29-31), therefore, with respect to the illumination.

8. Regarding claim 7, McGarry et al discloses the second angle of the illumination device (fig. 1a, items 24), which as explained above is 0 degrees, is substantially equal to a first angle position of the camera (fig. 1a, item 18), from the vertical which is also at 0 degrees, and substantially symmetric about the vertical since they are substantially symmetric to each other with respect to each other as seen in fig. 1a.

9. Regarding claim 11, an identifiable area wherein the wafer markings are located is identified because indicia are imaged in order to be able to be visible, therefore, located (col. 12, lines 57-59).

10. Regarding claim 13, Chang discloses that a processor (col. 13, line 25 and fig. 6 item 600) further comprises a software component for reading the wafer mark, whatever software component that commands the reading (col. 15, lines 38-43) of the execution system (fig. 6, item 600).

11. Regarding claim 15, McGarry et al discloses a method of non-oriented optical character recognition for use in locating and reading markings on a silicon wafer, the method comprising: generating a single wafer image, a first wafer image (col. 12, line 44) through sequentially taking a plurality of line images of the wafer in a first mode and second mode (col. 12, lines 43-45), and sequentially projecting alternating types of illumination in the area of the line image (col. 12, line 39-43) producing a single wafer image of sequential line images of alternating types of illumination, the first image as explained above; locating an area on the wafer containing the wafer markings by providing am image that shows the indicia by imaging it (col. 12, lines 54-56), and reading the wafer mark (col. 1, lines 34-36).

Chang discloses that wafers are traveling with respect to the whole system since they are traversing (fig. 5 and col. 14, lines 29-31).

12. Claims 17-19 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGarry in view of U.S. Patent No. 6671397 (Mahon et al).

Regarding claim 17, McGarry discloses a method of non-oriented optical character recognition for use in locating and reading markings on a silicon wafer, the method comprising: generating a single wafer image, a first image (col. 12, line 44), of interlaced line images of alternating types of illumination (col. 12, line 39-43) locating an area on the wafer containing the wafer markings by providing am image that shows the

indicia by imaging it (col. 12, lines 54-56), and reading the wafer mark (col. 1, lines 34-36).

McGarry et al does not disclose expressly separating the interlaced single wafer image into separate wafer images of the same illumination type (instead, McGarry et al takes two separate images) and having the wafers travel with respect to the system.

Mahon et al discloses the separation of an image into a plurality of wafer images of different illumination type by using a filter and controlling the light sources with the use of the filter (col. 3, lines 43-49). Mahon further discloses that the camera is positioned in a path of travel from the object of inspection (col. 3, lines 33-35), since the apparatus is above a high-speed positioning system, thus in a path of travel.

McGarry and Mahon et al are combinable because they are from the same field of endeavor, i.e. image capture of electronic equipment.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to separate the images of different illumination and to have a path of travel.

The suggestion/motivation for doing so would have been to provide a more accurate representation of the image by having many images of the same image represented in a different manner and provide an efficient, automated system by allowing the system to inspect many wafers automatically. Without the wafers moving with respect to the camera, each system would only be able to inspect one wafer, thus providing a very expensive system. By allowing the system to inspect more than one wafer, this is being more cost efficient.

Therefore, it would have been obvious to combine the method of McGarry with the separation and travel of Mahon to obtain the invention as specified in claim 17.

13. Regarding claim 18, McGarry et al discloses the step of projecting at least two sequentially alternating types of illumination in synchronicity with the taking of each sequential line image using a multiple illumination device (col. 12, lines 39-43) in visual communication with the line image taken of the wafer, since the images are taken of the wafer, thus, in visual communication.

14. Regarding claim 19, McGarry et al discloses a step of generating a single wafer image (col. 12, line 43-48) further comprises the step of projecting at least two sequentially alternating types of illumination in synchronicity with the taking of each sequential line image using a multiple illumination device (col. 12, lines 39-43) in visual communication with the line image taken of the wafer, since the images are taken of the wafer, thus, in visual communication.

15. Regarding claim 21, McGarry et al discloses the step of conducting a geometric transform of the area containing the wafer markings prior to reading the wafer markings to improve visibility of the markings by combining the images and thus the regions are four times the width, and geometrically transformed (col. 12, lines 54-55), improving the visibility for the extended darkfield embodiment. This must happen before the reading because reading the indicia is the last step.

16. Regarding claim 22, McGarry et al discloses examining each of the separated images and conducting a geometric transform on the area containing the wafer markings by combining them and making the regions four times the width (col. 12, lines

54-55) on each of the separated wafer images having different illumination since each of the images are combined with each other (col. 12, lines 43-44) and individually examining the transformed areas containing the wafer markings to determine if the wafer markings can be read, in which large indicia can be read (col. 12, lines 56-59) on any one of the separated, transformed areas containing the wafer markings.

17. Regarding claim 23, McGarry et al discloses step of combining at least two of the separated, differently illuminated and transformed areas containing the wafer markings to determine if the wafer markings can be read in the combined areas housing the markings (col. 12, lines 43-60).

18. Claims 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGarry et al in view of Mahon et al as applied to claim 17 above, and further in view of U.S. Patent No. 5825913 (Rostami et al).

Regarding claim 14, McGarry et al discloses a non-oriented optical character recognition apparatus for use in locating and reading markings on a silicon wafer, the apparatus comprising: a camera positioned at a first angle, an angle of 0, from vertical with respect to the wafer (fig. 1A, item 18), the camera adapted to take a plurality of sequential line images of the silicon wafer to produce a first wafer image (col. 12, lines 39-40 and 44-46); a multiple illumination device positioned at a second angle (fig. 1a, items 24), the angle also being at 0 degrees, the illumination device projects a plurality of different types of illumination that sequentially change in a synchronous manner with the taking of each of the sequential line images (col. 12, lines 39-43); and a processor in electronic communication with the camera and the illumination device, the processor

being what controls all the functions of the system including the image combining (col. 12, lines 43-44) and all other functions carried out in col. 12, line 36-col. 12, line 3) and must be in communication which is obvious if not inherent because in order to function the processor must receive the information from the rest of the system, wherein the processor receives the line images, which is also obvious if not inherent because in order to combine images (col. 12, lines 43-44), the processor must receive them, monitors the camera and the illumination device (col. 12, lines 39-49), and reads the wafer mark (col. 1, lines 34-36).

McGarry does not disclose expressly that the camera is positioned in a path of travel from the wafer and that the processor also monitors the path of travel rate and the software locates an edge, notch, center and mark area of the wafer, and separates the first wafer image into a plurality of wafer images of different illumination type (instead McGarry takes two separate images of different illumination in col. 12, lines 40-49). Furthermore, the different software components are not expressly disclosed as separate entities on one processor, however, whether there are many processors or one processor, the invention is functionally equivalent.

Mahon et al discloses a processor controlling the separation of an image into a plurality of wafer images of different illumination type by using a filter and controlling the light sources with the use of the filter (col. 3, lines 43-49). Mahon further discloses that the camera is positioned in a path of travel from the object of inspection (col. 3, lines 33-35), since the apparatus is above a high-speed positioning system, thus in a path of travel. Mahon also discloses the processor monitoring the path of travel rate. Mahon

discloses that the speed of the system is governed by the speed of the camera (col. 6, lines 5-6) which is positioned in the path of travel and presented to the camera along this path of travel (col. 7, lines 46-44). The processor monitors the frame grabber 26 from the camera (col. 3, lines 45-46), and thus the speed of the camera, therefore, the path of travel rate is governed directly by the speed of the camera which is controlled by the processor, as explained above

McGarry and Mahon et al are combinable because they are from the same field of endeavor, i.e. image capture of electronic equipment.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to separate the images of different illumination and to have a path of travel and rate for the system.

The suggestion/motivation for doing so would have been to provide a more accurate representation of the image by having many images of the same image represented in a different manner and provide an efficient, automated system by allowing the system to inspect many wafers automatically. Without the wafers moving with respect to the camera, each system would only be able to inspect one wafer, thus providing a very expensive system. By allowing the system to inspect more than one wafer, this is being more cost efficient. The motivation for having a rate is so that it is clear how many devices would be inspected, thus providing a more user-friendly system by showing the user how fast the system is.

McGarry et al (as modified by Mahon et al) does not disclose expressly locating an edge, notch, center and mark area of the wafer.

Rostami et al discloses locating an edge (col. 4, lines 15-18), a notch (col. 6, line 23), a center (col. 5, line 7-8) and a mark area (col. 2, line 35-36) of the wafer (col. 1, line 6).

McGarry et al (as modified by Mahon et al) and Rostami et al are combinable because they are from the same field of endeavor, i.e. inspecting semiconductors/ wafers

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to locate those certain points.

The suggestion/motivation for doing so would have been to provide the best image of the wafer by finding its orientation and making sure the wafer is properly placed.

Therefore, it would have been obvious to combine the apparatus of McGarry with the separation, movement and rate of Mahon and the location of certain orientation parameters of Rostami et al to obtain the invention as specified in claim 14.

19. Regarding claim 20, Rostami discloses examining at least one wafer image selecting at least one of the separated images, either image from McGarry which corresponds to those mentioned in col. 3, lines 30-35 locating a notch (col. 6, line 23), on the edge of at least one of the selected wafers (fig. 2), and locating the approximate center of the selected images (col. 3, lines 44-45).

20. Claim 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGarry in view of Chang, as applied to claims 1 and 15 above, and further in view of Rostami et al.

Regarding claim 12, McGarry (as modified by Chang) discloses all of the claimed elements as set forth above and incorporated herein by reference.

McGarry (as modified by Chang) does not disclose expressly locating an edge of the wafer an edge notch of the wafer, the center of the wafer and the area containing the wafer. McGarry discloses locating the wafer markings imaging the markings so that they can be seen (col. 12, lines 57-58)

Rostami et al discloses locating an edge of the wafer (col. 4, lines 15-18), an edge notch of the wafer (col. 6, line 23 and fig. 2), the center of the wafer (col. 3, lines 44-45), and the area containing the wafer markings (col. 2, line 35-36). McGarry also discloses locating the wafer markings imaging the markings so that they can be seen (col. 12, lines 57-58).

McGarry (as modified by Chang) and Rostami et al are combinable because they are from the same field of endeavor, i.e. inspecting semiconductors/ wafers.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to locate those certain points.

The suggestion/motivation for doing so would have been to provide the best image of the wafer by finding its orientation and making sure the wafer is properly placed.

Therefore, it would have been obvious to combine McGarry (as modified by Chang) with the location ok key points of Rostami et al to obtain the invention as specified in claim 12.

21. Regarding claim 16, McGarry discloses the steps of separating the single wafer image into individual wafer images having the same illumination by recognizing the single wafer image as the first image of a certain illumination type (col. 12, lines 43-45). Rostami et al discloses examining at least one wafer image (col. 3, lines 30-35) to locate an edge (col. 4, lines 15-18), a notch (col. 6, line 23) on the edge (fig. 2), and the approximate center of the wafer (col. 3, lines 44-45).

22. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGarry in view of Chang, as applied to claim 1 above, and further in view of Mahon.

Regarding claim 8, McGarry (as modified by Chang) discloses all of the claimed elements as set forth above and incorporated herein by reference.

McGarry (as modified by Chang) does not disclose expressly that the processor receives the line images from the camera and that there is software that receives it.

Mahon discloses that the processor receives the images because it comprises a frame grabber for the camera; thus, it receives the images. The software that receives it is the software of the processor that manages the frame grabber.

McGarry (as modified by Chang) and Mahon et al are combinable because they are from the same field of endeavor, i.e. image capture of electronic equipment.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to receive the images at the processor.

The suggestion/motivation for doing so would have been to allow the processing to continue by providing an image, thus speeding up/ permitting the process to continue.

Therefore, it would have been obvious to combine McGarry (as modified by Chang) with the receiving of images at the processor as disclosed by Mahon et al to obtain the invention as specified in claim 8.

23. Claim 9 is rejected for the same reasons as claim 14. Thus, the arguments analogous to that presented above for claim 14 are equally applicable to claim 9. Claim 9 distinguishes from claim 14 only in that claim 9 is dependent on claim 1 which has the added reference of McGarry et al. Since all the elements of claim 9 are rejected in claim 14, prior art applies.

24. Claim 10 is rejected for the same reasons as claim 9. Thus, the arguments analogous to that presented above for claim 9 are equally applicable to claim 10. Claim 10 distinguishes from claim 9 only in that claim 10 controls the features instead of monitors the features. Mahon et al teaches further this feature, i.e. the frame grabber that controls the rate and thus movement and switching circuits that control the light sources (col. 3, lines 45-46).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen S. Yuan whose telephone number is (571)272-2902. The examiner can normally be reached on Monday to Thursdays, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571)272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KY
1/16/2007

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SUPERVISORY PATENT EXAMINER